

Resistance Characteristic Curves

Name: _____ Section: 4BL-____ Date performed: ____/____/____

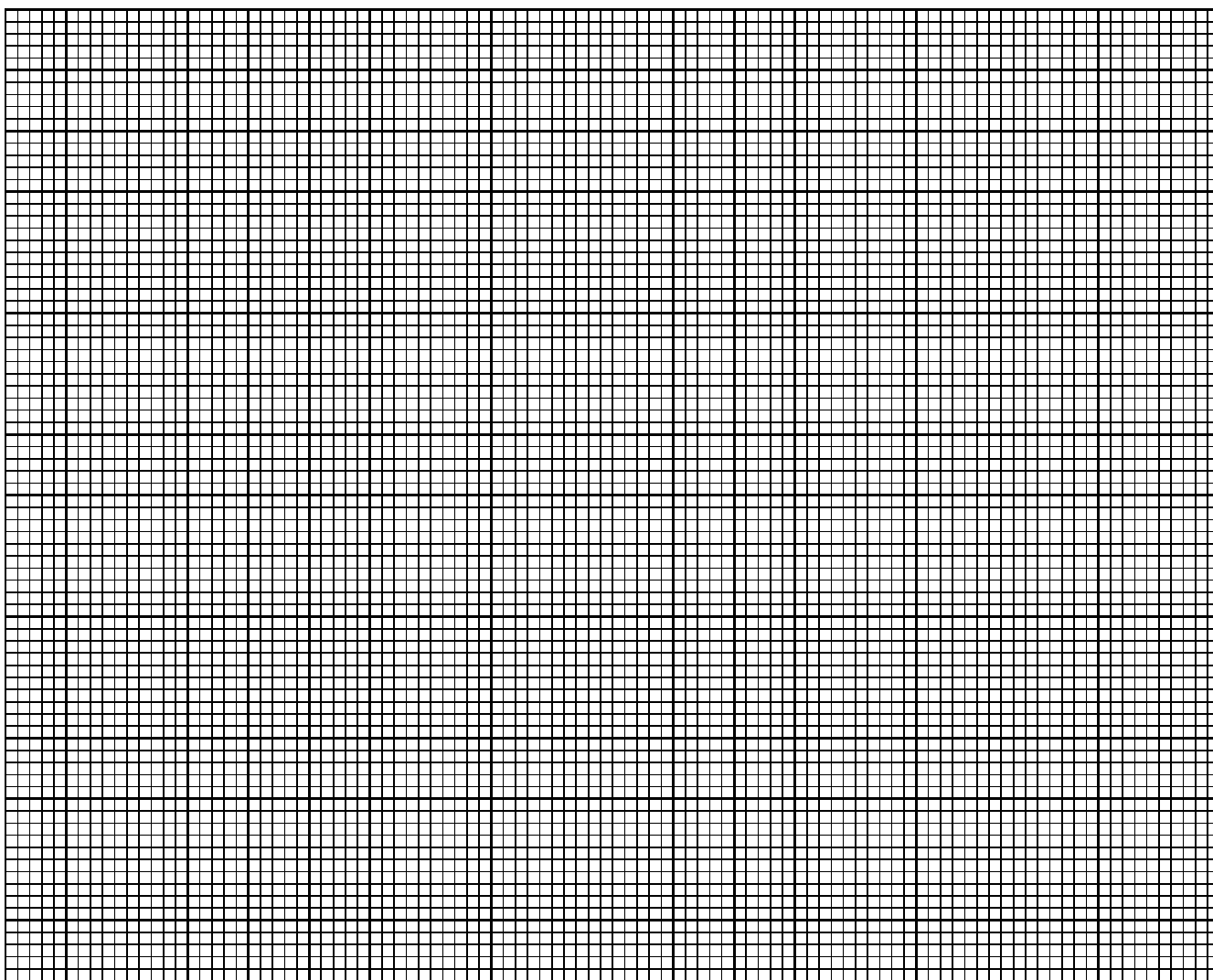
Lab station: _____ Partners: _____

Circuit box #_____

330 Ω resistor

Draw circuit diagram:

$$R_{\text{DMM}} = (\text{_____} \pm \text{_____}) \Omega \quad (\text{range: } \text{_____})$$
[illegible][illegible]



Show calculation:

slope = (_____ \pm _____) mA/V

Calculate sums with Excel:

$$\begin{aligned}
 N &= \underline{\hspace{2cm}} & \sum_i V_i^2 &= \underline{\hspace{2cm}} \text{ V}^2 \\
 \sum_i V_i &= \underline{\hspace{2cm}} \text{ V} & \sum_i I_i^2 &= \underline{\hspace{2cm}} \text{ mA}^2 \\
 \sum_i I_i &= \underline{\hspace{2cm}} \text{ mA} & \sum_i V_i I_i &= \underline{\hspace{2cm}} \text{ V mA} \\
 \sum_i (mV_i + b - I_i)^2 &= \underline{\hspace{2cm}} \text{ mA}^2 \quad (\text{after calculating } m \text{ and } b)
 \end{aligned}$$

Calculate slope and intercept using linear regression (show all calculations):

$$\begin{aligned}
 m &= (\underline{\hspace{2cm}} \pm \underline{\hspace{2cm}}) \text{ mA/V} \\
 b &= (\underline{\hspace{2cm}} \pm \underline{\hspace{2cm}}) \text{ mA}
 \end{aligned}$$

Calculate resistance from regression slope:

$$R = (\text{_____} \pm \text{_____}) \Omega$$

Discrepancy tests:

Hand graph slope vs. regression slope:

Regression intercept vs. zero:

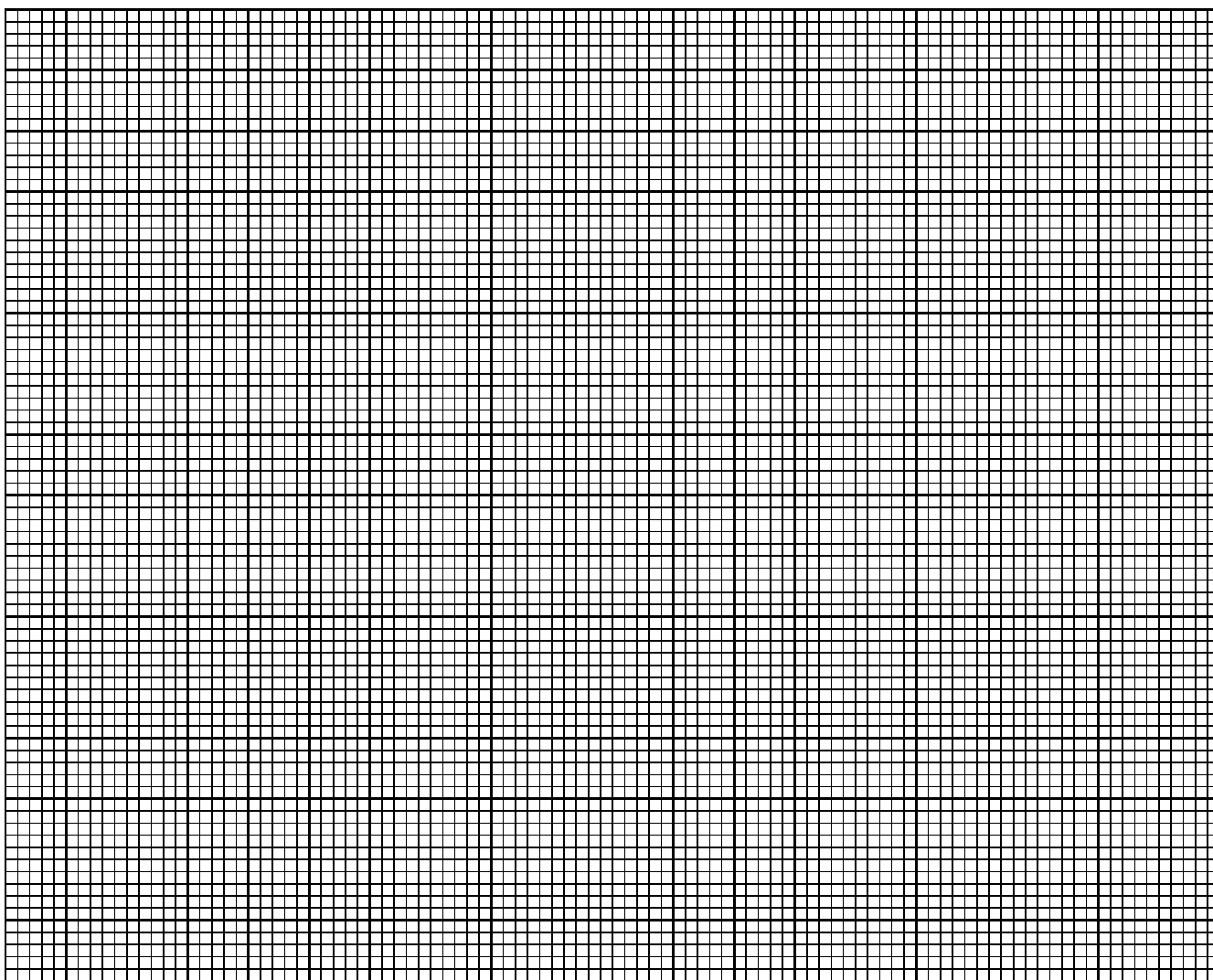
Measured resistance vs. calculated resistance:

Light bulb

Draw circuit diagram:

V (V) (range)	I (mA) (range)	V (V) (range)	I (mA) (range)
()	()	()	()
()	()	()	()
()	()	()	()
()	()	()	()
()	()	()	()
()	()	()	()
()	()	()	()
()	()	()	()
()	()	()	()
()	()	()	()

Calculate the resistance at two different voltages. Are they the same?



Based on the resistance characteristic curve, is the resistance of the light bulb increasing or decreasing with voltage? Explain how you can tell.